

good effect upon the pollen, and therefore assists in securing the fertilisation of the flowers.

Since that time the pot fruit trees cultivated in the Sawbridgeworth nurseries of Messrs. T. Rivers and Son have provided a unique object lesson to British fruit growers, and the system has been imitated in other commercial establishments and in many private gardens, a notable instance being the gardens belonging to Mr. Leopold de Rothschild at Gunnersbury House, Acton, where excellent results are obtained notwithstanding the fact that the gardens are in London. The author of the book under review has been charged with the care of the orchard houses at Sawbridgeworth for more than twenty years, and the details of cultivation he explains are those which have been practised with such conspicuous success in that establishment. It may be admitted that the orchard house is more necessary in the colder districts of midland and northern counties than in the south, but even in the south the season of ripe fruits can be prolonged by orchard house culture, and more perfectly developed apples and pears obtained for particular purposes. Who that has seen the exquisite specimens exhibited at the autumn fruit shows has not wished to cultivate fruits of similar excellence? It is the mission of Mr. Brace's book to assist the reader to accomplish this purpose.

In the first chapter the author has described very minutely the construction of the best type of houses, and the importance of commencing with suitable structures is so great that we are not disposed to complain that the subject occupies one-fifth of the book, as well as several diagrams. From every point of view houses with span-shaped roofs are best, and if Mr. Brace's instructions are studied, the cultivator, by moving his trees out of doors at suitable periods, will be able to make the most of the space afforded in the houses.

In chapter ii., in which the furnishing of the houses with trees is considered, the best methods of arranging them are described, so that as many trees may be grown as possible, and yet none be obscured by the others. If only one house is built, and this is of an appreciable size, it should be divided into sections, because peaches and nectarines can be treated more successfully when grouped by themselves, as the trees need to be syringed daily until the fruits begin to ripen, which would not be possible if cherries or plums, which ripen much earlier in the season, were associated with them in the same division.

Chapter iii. must be read very carefully, and should be frequently referred to by the inexperienced cultivator. It contains details of cultivation, explains the best forms of training for the different kinds of trees, the process of potting, methods of forcing, pruning, summer pinching, value of surface dressings to the roots, cost of trees, &c. In the cultivation of fruit trees in pots, whether half standards, or bush trees of peaches, nectarines, and plums, or pyramids of apples and pears, the work of pruning and pinching is of the greatest importance, and if it be done unskilfully not only will the trees be unshapely and the fruit spurs become longer than is desirable, but the trees will fail

to contain sufficient fruitful wood to produce satisfactory crops.

The best varieties of the different kinds of fruits for pot culture are described in chapters iv. and vii., and in chapter v. the subject of insect pests is dealt with, and the measures to adopt against these and the peach mildew are explained. Chapter vi. consists of a brief calendar of operations in the unheated orchard house for each month of the year, which is sufficient to remind the practitioner of the correct time to carry out the operations which are more fully described in the previous pages.

In addition to other illustrations, the work is adorned with full-page plates representing pot fruit trees in bearing, being reproductions from photographs obtained in Messrs. Rivers' nursery. These are reproduced in the very best manner, and the printing throughout the book is clear, and the type large and distinct.

The book has little claim from a literary point of view, but the author has described in plain words a system of cultivating fruit trees in pots which, if faithfully followed, will be attended with absolute success.

R. H. P.

A TRAVELLER'S COMPANION.

Stanford's Geological Atlas of Great Britain (based on Reynolds's Geological Atlas). By Horace B. Woodward, F.R.S., F.G.S. Pp. x+140; with 34 coloured maps and 16 plates of fossils. (London: E. Stanford, 1904.) Price 12s. 6d. net.

THIS work is a re-written and revised edition of the well known atlas, which was long a familiar object to the students of shop-windows near Temple Bar, associated as it was with geological diagrams of a highly venerable aspect. It was always attractive by its very neatness and compactness, and has gained further in these respects under Mr. Stanford's care. The maps are printed in colours, and the concluding plates of fossils, reproducing for the most part Mr. Lowry's refined workmanship, are almost as delicate as the engraved originals, which were published in 1853. These plates, by the by, are not now arranged so consecutively as could be desired. Mr. H. B. Woodward has brought the text up to a modern standpoint, and we note references to the Pendleside series, to the Mesozoic rocks in a volcanic vent in Arran, and to the occurrence of Pliocene mammalian remains in a fissure in Derbyshire—all matters of very recent history. The Upper Greensand and Gault are described and mapped together as Selbornian, a combination of great stratigraphical convenience, however much it departs from the petrological and geognostic mapping of early days. Here we see at once how the philosophic view of "organised fossils," introduced by William Smith, has made two types of geological maps necessary, one for the students of the earth's history, and one for the engineers, landowners, and agriculturists, to whom Smith made his first appeal. Luckily, in our British Isles, our "drift" maps, on a reasonable scale, go far to satisfy both requirements.

Mr. Woodward's descriptions of the various counties contain rather too much matter that could be discovered from the maps themselves. Though dealing with a land of most fascinating variety, they do not always rise to the demands made by the salient scenic features. Yet these are the features that strike the common traveller, to whom this work must always be a boon. From his point of view we have read the account of Gloucestershire a second time, and, of course, discover nothing to add, while we are grateful for a good deal of graphic description, tersely worded. The matter probably only needs a new arrangement, so that the reader who descends in imagination or in memory from the steep side of the Forest of Dean, and wonders at the great scarp of the Cotteswolds, facing him ten miles off across the Severn, is not dragged aside to learn that Coal-measures were discovered in the Severn Tunnel, and the irritating fact that "sulphate of strontium is worked at Wickwar in the Keuper Marl." The traveller wants to move forward; the open landscape lies before him; when he has gained his first broad physiographic view, he will condescend to search for fossils, and to rejoice in geodes of celestine.

The exceptional knowledge of the country possessed by the author is apparent in all these careful pages. He has added, moreover, exceedingly practical descriptions of the geology that is to be learned along the main lines of British railways. His views on the nomenclature of fossils are known from his published writings; but, while most of us are sadly inconsistent, he yields perhaps too little to the purists. If Mr. Woodward goes so far as *Doryderma* and *Cœlonautilus*, where none will blame him, why does he retain *Ammonites* and *Goniatites* as unrestricted generic names? Why *Echinocorys scutatus*, which seems to surpass the historical acuteness of Mr. C. D. Sherborn (see "Index to Zones of the White Chalk," *Proc. Geol. Association*, June, 1904), and, side by side with it, *Galerites albogalerus*? We doubt also *Protocardium* for *Protocardia*; but these matters are outside the main intention of the atlas. As a companion in Great Britain, this handy book is to be recommended to every traveller. The complete revision of the Scotch map, which is now so admirable, despite its comparatively small scale, makes us hope that Ireland, as a country of equal interest and variety, may be included in the next edition.

G. A. J. C.

THE TEACHING OF SCIENCE.

The Preparation of the Child for Science. By M. E. Boole. Pp. 157. (Oxford: Clarendon Press, 1904.) Price 2s. 6d.

Special Method in Elementary Science for the Common School. By Charles A. McMurry, Ph.D. Pp. ix + 275. (New York: The Macmillan Company, 1904.) Price 3s. 6d. net.

A GREAT change in the character of the books concerned with the teaching of science has taken place during the last twenty years or so. A quarter of a century ago the claims of science to a place in the school curriculum were being advocated vigorously,

and men of science had still to convince reigning schoolmasters that no education was complete which ignored the growth of natural knowledge and failed to recognise that an acquaintance with the phenomena of nature is necessary to intelligent living. Speaking broadly, it may be said that most classicists even admit now that there are faculties of the human mind which are best developed by practice in observation and experiment. One consequence of the success which has followed the persistent efforts of Huxley and his followers—to secure in the school an adequate recognition of the educative power of science—has been that modern books on science teaching are concerned almost entirely with inquiries into the best methods of instructing young people, by means of practical exercises, how to observe accurately and to reason intelligently.

Mrs. Boole deals with the earliest education of the child, and gives a great deal of attention to the years which precede school life. Her book may be warmly recommended to parents anxious to adopt sane methods of educating their children and to teachers responsible for the training of the lowest classes of schools. Mrs. Boole rightly insists that the development in the child of the right attitude towards knowledge is of more importance during early years than the actual teaching. We agree with her, too, that "the best science teacher is usually a thorough-going enthusiast in the science itself, who in the intervals of regular teaching, gets his pupils to assist him in his own investigations or pursuits." But, unfortunately, the teaching profession is at present hardly attractive enough to secure the services of a sufficient number of ordinarily well educated men, and we shall have to wait a long time before we can expect to find many men of science engaged upon original research also teaching science to children in schools. Mrs. Boole's little book deserves to be read widely.

Like many other American educationists, Dr. McMurry attempts to do too much for the teacher. The larger part of his book is devoted to "illustrative lessons" and "the course of study," minute instructions being given as to what science subjects should be taught in each of the terms of each of the years spent by children in the elementary school. The teacher will deal most satisfactorily with those subjects of science he knows best, and in which he is most interested. From the point of view of the British teacher at least, it is inadvisable to attempt to impose a detailed scheme of work drawn up by somebody in another district and unfamiliar with the precise conditions and environment of the school in which the science teaching is to be done. Even if this were not the case, Dr. McMurry's scheme of work expects the class to accomplish far more in a term than can be studied satisfactorily in that period. Moreover, subjects too diverse, and hardly at all related one to the other, are prescribed for a single term. But Dr. McMurry's ideal is better than his practice; he says:—"it is easy for us to expect too much from formal method. The atmosphere which the teacher diffuses about him by his own interest and absorption in nature studies is more potent than any of the devices of method."

A. T. S.